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EDITORIAL.

The Future for Derris.

During the past year the Department of Agriculture has received a number of enquiries from local planters of derris regarding the marketing of their crop, and we must admit that efforts to place buyer and seller in touch have by no means inevitably resulted in satisfactory business. The local shipper is, of course, guided by the demand from his buyer in the United Kingdom, America, or elsewhere, and the lack of interest in derris which these buyers have evinced in recent months has curtailed the business of our exporters, and in some cases, left the grower with unsold stocks.

Writing editorially on this subject a year ago, we pointed out that with the greatly increased acreage planted during the past year or so, the market—as yet a small one—may become overstocked, with a consequent lowering of the price level, and we added, that with increasing stocks on the market, the buyer will become more discriminating as to the quality of the product he purchases.

The fact that subsequent events have shown this view of the subject to be justified is no source of satisfaction to the writer, but the failure of derris to hold its position in the market appears to have been due more to price competition with a product possessing similar toxic qualities—cube—than to the increased production of derris. It must be admitted, however, that the poor reputation in the past of Malayan derris prejudiced the sale of this product, and in order to dispel this prejudice it is essential that the endeavours which have been made in recent years to popularize the cultivation in Malaya of derris of proven quality be continued and the low quality root ultimately eliminated from the market.

The doubt has been expressed as to whether a market exists in America for root of very high concentration of rotenone at a price commensurate with its toxic content, for the reason that such root presents practical difficulties in its application as an insecticide. The effect of this objection is to prejudice Malayan derris root of high rotenone content, and this raises the question as to whether it is desirable to plant proven high quality material, such as *Derris elliptica,* Changi No. 3, or another variety which gives higher yields of root than Changi No. 3 and has a content of toxic constituents which is fully adequate to satisfy market demands. While the solution of this problem is subject to the results of investigations now in

hand, it may well be that the safest course will be to plant equal areas of Changi No. 3 and "Sarawak creeping," a policy which might lower cost of production by reason of higher yields from the latter variety, and the maintenance of quality to the present required standard.

The complexities of the situation, the doubt which has existed as to the planting policy to be adopted, and the uncertainties of the future, fully justified the visit to the United States of America of Major C. D. V. Georgi, O.B.E., of this Department, and the article which he contributes to this number will be read with interest by those of our readers who are interested in the cultivation or marketing of this crop.

Major Georgi's visit to America has been fruitful in many respects, in particular because it has brought this Department more personally in touch with the American market, and has enabled the Department to review the whole question with the ultimate object of supplying the class of product which will be most acceptable to the trade. As a direct result of this visit, we receive regular information from New York concerning the position of the market, which we pass to our readers through our "Market Prices."

The present prospects for Malayan derris in the United States are not encouraging, and the future is difficult to foresee. Our personal opinion is that the present tendency to employ plant insecticides in place of arsenical insecticides will gain in popularity, but whether derris will be able to maintain its position in competition with cube is less certain. We believe, however, that if our producers are able to market a standardized product at a price at which it can compete with cube—and this should not be impossible—Malayan derris can be established in the market. In the past, the market for derris has been prejudiced by the wide variation in quality, and by lack of knowledge in consuming countries of the fact that derris, as marketed to-day, is not a jungle product, but a plantation crop, and that as a result of investigations by this Department, cultivators can now produce a high-grade product, in every way suitable for the requirements of the market.

We believe that Major Georgi's visit to America, and the contacts which he has made with business men in that country,will be fruitful by increasing confidence in the purchase of Malayan derris.

Original Articles.

THE OUTLOOK FOR MALAYAN DERRIS IN THE UNITED STATES OF AMERICA

By
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Introductory.

A large amount of selection work on derris has been carried out in recent years by the Department with the object of developing strains of plants with roots of a high toxic content, thereby eliminating to a large extent the variability in quality of commercial consignments of root.

The work has been attended with a certain amount of success, strains of plants of *Derris elliptica*, Changi No. 3, having been isolated in which the rotenone content, calculated on a moisture-free basis, is of the order of 12 per cent. The figure for the ether extract on a similar basis lies between 25 and 30 per cent.

In the early part of last year when the writer proceeded on long leave, permission was granted him to travel via America to discuss the results of this selection work with officers of the United States Department of Agriculture and with representatives of insecticide firms in New York. At the same time, opportunity was taken to collect information regarding the position of derris in relation to the other plant insecticide with which it competes, namely cube.

The present paper is a summary of a detailed report already submitted to Government. Mention is made, however, of the organization established recently in the United Kingdom for co-ordinating the results of research work on insecticide materials of vegetable origin being carried out in various parts of the British Empire.

Sources of Supply of Cube Root.

Cube (pronounced koobay) is the trade term applied to roots of various species of the genus *Lonchocarpus*, which is found widely distributed in the tropical parts of South and Central America.

Similarly to derris in Malaya, cube has been used from time immemorial by the South American Indians for fishing purposes. Plants were grown clandestinely, their cultivation in certain areas being prohibited by law owing to the detrimental effect of an increasing use of the root on the fish population of the rivers.

The discovery by Clark(1) of rotenone in cube root drew the attention of the insecticide manufacturers to the potential value of this root as a further source of supply of raw material.

The possibility of establishing a new industry also caused a change in the official attitude, campaigns being started to interest cultivators in this crop. These campaigns were highly successful, large areas both in Brazil and Peru having been

planted in recent years. In this connexion it may be mentioned that in Peru the cultivation and industrial exploitation of plants belonging to the genus *Lonchocarpus* has been declared by Presidential Decree to be of public utility.

At the present time Brazil is the principal country of export, being followed by Peru. Smaller quantities of the roots are exported from Venezuela and Colombia, while it is understood that if there is a marked increase in the use of cube, Nicaragua is considering the possibility of developing a local industry.

It may be of interest to record that while cube is the trade term, the root is known as "timbo" in Brazil, "barbasco" in Peru and "haiari" in British Guiana.

Similarly to derris, wide variations have been found in the toxic contents of the roots of the various species of *Lonchocarpus*. With the objects of developing strains of high quality plants and reducing such variation to a minimum, selection work on similar lines to that being carried out on derris by this Department has been initiated in Peru.

Stringent regulations having for their object the prevention of the export of viable material are a feature of the cube industry at present. For example, in Peru, the export of *lonchocarpus* cuttings is prohibited. Further, with the object of preventing even the root from being used as a source of supply of planting material, all root exported must be despatched in an air-dry state, say 8 to 10 per cent. moisture. In Brazil, the export of whole root, even though dried, is only allowed by special permit, the bulk of the root being shipped in a ground state. Such root is referred to in the returns issued by the United States Department of Commerce as "Root, advanced in value." Root imported into the United States in this condition is subject to a 10 per cent. *ad valorem* duty. This duty would also be applicable to ground derris root.

Two reasons were adduced for these stringent precautions; the possibility of a vast increase in the cube industry if means are found to replace arsenical insecticides by plant insecticides of this type, and the prevention of the establishment of a major agricultural industry in other parts of the world on plantation lines, such as occurred in the case of the plantation rubber industry.

While it is not suggested that the plant insecticide industry will ever rival the plantation rubber industry in importance, there is no doubt that if this replacement is successfully accomplished the cube industry in Brazil and Peru will become of major importance and will doubtless be closely guarded, having regard to the nationalistic tendency prevailing throughout the world at the present time.

Trade in Derris and Cube Roots.

Table I gives the amounts of derris and cube roots, together with their countries of origin and declared values, imported into the United States during the years 1936, 1937 and the first half of 1938.

Small amounts of roots in transhipment from other countries to the United States have been omitted from the table; they do not affect the figures to any appreciable extent.

Table I

Imports of Derris and Cube Roots into the United States for 1936, 1937 and First Half of 1938.

Description of Root	Country of Origin	1936		1937		1938 (January to June)	
		Amount	Value	Amount	Value	Amount	Value
		lbs.	$	lbs.	$	lbs.	$
Derris, Crude	Malaya ...	332,251	69,182	401,975	72,613	122,746	16,480
	Netherlands Indies ...	28,581	5,145	57,524	10,609	62,710	8,797
	Philippine Islands ...	149,505	21,626	110,528	14,046	19,497	2,640
	Other Sources ...			368	74		
	TOTAL ...	510,337	95,953	570,395	97,342	204,953	27,917
Cube, Crude	Brazil ...	508,570	34,044	197,892	16,677	25,744	1,476
	Peru ...	171,600	19,350	378,259	34,487	213,444	14,075
	Venezuela ...	22,750	1,775				
	Colombia ...	1,200	156				
	TOTAL ...	704,120	55,325	576,151	51,164	239,188	15,551
Cube, Advanced in Value	Brazil ...	1,124,936	172,239	1,263,773	190,844	1,268,337	181,439
Cube	GRAND TOTAL ...	1,829,056	227,564	1,839,924	242,008	1,507,525	196,990

The figures show a steadily growing popularity of cube compared with derris. Thus during the years 1936 and 1937 between three and four pounds of cube were imported for every pound of derris, but during the first half of 1938 this amount of cube rose to more than seven pounds.

The steadily increasing proportion of ground cube root compared with the total amount imported is noticeable. Thus in 1936 the proportion was 61.5 per cent., increasing in 1937 to 68.7 per cent. and in the first half of 1938 to 84.1 per cent.

With regard to the figures for derris, the decreasing exports from the Philippine Islands and the gradually increasing exports from Netherlands Indies are of interest. In the case of the Philippine Islands product it was stated that the decreasing importance of the trade was to a large extent due to marked variability in quality of the root.

Quality of Products.

Importers are still complaining of the variation in quality of Malayan derris. Consignments of root guaranteed to contain a minimum of say 5 per cent. rotenone are found to be deficient on analysis. The sample for analysis is drawn not from the bales of root but from the powder resulting from the grinding of a proportion of the bales, say 10 per cent., taken at random from the consignment. Sampling errors are thereby reduced to a minimum.

Two explanations suggest themselves for this somewhat disturbing contention. It is more than likely that with the high prices prevailing a few years ago for derris cuttings on account of the greatly increased planted area and the cultivators' lack of knowledge regarding proven material, some of the newly-opened areas were planted with cuttings from stock poor in rotenone, for example *D. malaccensis* plants from the Kinta District or even low grade *D. elliptica* plants of which there is ample evidence of being established in various parts of the country.

From the point of view of the native cultivator, rotenone is a comparatively recent introduction as a factor of importance in disposing of a crop of derris. It may well be, therefore, that unless such a cultivator has taken the trouble to verify the origin of his stock, the rotenone content may vary widely from generation to generation. It will be dependent to a large extent on that of the strongest growing plants since it is from such plants that a cultivator is likely to select his cuttings.

It is also felt that the absence to-date of a definite correlation between quality of root and price may be a contributory cause of this variation. For example, cases have occurred in which dealers who have sold root on a 5 per cent. rotenone basis, have suffered a deduction in price because the rotenone content on sampling and analysis has been found to be less than the amount specified, but they have not received a corresponding premium when the rotenone content of the consignment is in excess of the contract. Such a procedure is always calculated to induce the dealer to scale down his product to the minimum and to take a chance that the deficiency, if any, will not be discovered.

The remedy lies, therefore, in ensuring that both estates and small producers plant only material of proved high toxic content and propagate further stocks from that material alone. In the case of the small producer, a buying organization dealing only in such high quality root would also be necessary to ensure his receiving a fair price for his product.

With increasing quantities of high quality root coming forward, the industry will be in a much stronger position to insist upon the establishment of a price basis in which quality of root would receive its just reward. With the changed conditions the possibility of derris root of low and even moderate toxic content, for example, *D. malaccensis* from the Kinta District, being used only as a diluent or actually becoming unsaleable, unless such root was found to be a specific against a certain insect, must not be overlooked. The use of the root as a diluent will be referred to later.

As regards cube root, both Brazil and Peru appear to have profited by the experience of Malaya in this respect and to have paid considerable attention to the question of the maintenance of a standard quality of product.

Brazilian powdered root is said to average about 5 per cent. rotenone with a total of 22 per cent. ether extract. It is understood that this is not a whole ground root but a sieved product from which the fibrous portion of the whole root is excluded. Since the fibrous portion is low in toxic content the sieved product will be higher both in rotenone and ether extract than the whole root.

The powdered root is packed in sealed barrels or cases and each consignment is accompanied by a certificate of analysis.

It would appear that the milling of cube root in Brazil is practically a monopoly. This, together with the fact that the root is powdered, thereby making blending of material a comparatively simple process, facilitates the shipment of a uniform product.

At present only whole root is exported from Peru. There are two grades, the higher quality averaging 5 per cent. rotenone with 16 per cent. total ether extract and the lower grade 4 per cent. rotenone with 14 per cent. total ether extract. Attention has been drawn previously to the selection work initiated in Peru with the object of isolating plants with roots of high toxic content for propagating purposes.

It is interesting to note that all cube root from Peru is exported via the River Amazon and Brazil, the Andes forming a barrier to the export of the material from the western seaboard of that country.

The general impression is that with any marked increase in the use of cube, mills will be erected in Peru, thus bringing that country into line with Brazil.

Derris and Cube as Insecticides.

The New York insecticide manufacturers are still inclined to regard rotenone as the criterion of insecticidal value, the ether extract being considered of somewhat secondary importance.

This seems to be due to the fact that in the control of the three major agricultural pests against which both derris and cube are used, the pea aphid, the Mexican bean beetle and three species of cabbage worms, the rate of application has been standardized on a rotenone basis. Further, both laboratory and field tests have shown cube to be equally effective as derris of the same rotenone content.

This view is not taken by the Food and Drug Administration of the Department of Agriculture who regard the ether extract as of primary importance. For example, they require only the total amount of either derris or cube resins, that is the total amount of ether extract, to be entered on the label of a derris or cube insecticide for sale.

A specimen of an acceptable label is as follows:—

		per cent.
ACTIVE INGREDIENT		
Derris resins	...	—
INERT INGREDIENTS	...	—
TOTAL	...	100.00

The rotenone content may, however, be entered on the label. Such a practice is optional. In such cases the label would read

		per cent.
ACTIVE INGREDIENTS		
Rotenone	...	—
Other Cube Resins	...	—
INERT INGREDIENTS	...	—
TOTAL	...	100.00

The question of the relative toxicities of rotenone and ether extractives other than rotenone is still unsettled. There is a feeling that the ether extractives other than rotenone in derris are either more toxic or more repellant than those in cube but there is no scientific evidence to support it. The general opinion is that a definite statement regarding the relative toxicities of derris and cube must be postponed until the results of tests with accurately analysed samples of the same particle size against a number of species of insects are available.

The analytical aspect is stressed because if rotenone is such a strong insecticide compared with other ether extractives, it is essential to determine the percentage with a high degree of accuracy, also to be able to separate it completely from the other extractives, thereby allowing a fair comparison of insecticidal values to be made. At present, the method for the estimation of rotenone, more particularly in derris root, is not characterised by the high degree of accuracy usually associated with quantitative analysis. Workers in various countries are actively engaged in endeavouring to improve the method and to arrive eventually at a standard method to be used when assaying the root.

As far as could be ascertained, this difficulty of complete separation of rotenone from the other extractives does not arise to the same extent in the case of cube root.

Similarly, the particle size must be emphasized. It is stated that the derris powder milled in the United States is of a finer particle size than the powdered cube root imported from Brazil, in which case the apparent superiority of derris over cube towards a certain insect may be due to this cause.

Prices of Derris and Cube.

The present preference shown for cube is due to the fact that it is offered at a lower price than derris of the same rotenone content. Cube is therefore the more economical insecticide to use against those major agricultural pests to which reference has already been made.

At the time of the writer's visit to New York (April 1938) the current prices for root of 5 per cent. rotenone content were about 14 cents for derris and 10 cents for cube (United States currency). For ground root of the same quality and ready for use as an agricultural dust the prices were 39 cents for derris and 28 cents for cube. Between 130 and 140 lbs. of ground cube could therefore be purchased for the price of 100 lbs. of ground derris of the same rotenone content. This represents a considerable saving to the farmer, especially during the present recession.

Further, the general opinion was held that with increasing supplies of both derris and cube coming forward prices would tend to fall, also the price advantage in favour of cube would tend to diminish.

This all-important price difference is the only factor opposing the use of derris in the United States. More than one insecticide manufacturer assured the writer that if only Malayan derris were available at a price with which it could compete with cube they would prefer to use derris. They considered that Malayan exporters, by seeking too high a price for their product in recent years, had tended to stimulate the production of cube.

The opinion expressed regarding a fall in price of the whole root and a diminution in the price advantage in favour of cube has been confirmed. Reference to the *Malayan Agricultural Journal* for December 1938 shows that the latest price for derris root of 5 per cent. rotenone content, c.i.f. New York, is about 11 cents per lb., that for cube root of the same rotenone content being about 8.5 cents per lb.

With regard to cube, it would appear that this is now liable to royalties under the Dennis patent amounting to rather less than 1 cent per lb. bringing the total cost of this root up to approximately 9.5 cents per lb. c.i.f. New York.

The Dennis patent refers to a patent granted in the United States in 1927 to Mr. W. J. Dennis who obtained exclusive privileges to the use of ground cube root with the fibrous element removed as an insecticide and vermifuge.

The admissibility of the patent on certain technical grounds was challenged by some of the insecticide manufacturers but apparently the original patent has been upheld by the Courts.

Further, with the fall in the price of both commodities the price advantage in favour of ground cube root has diminished, there being only a 4 cent spread between the price at which derris and cube powders are offered compared with one of 11 cents as mentioned above.

No mention has been made of the price of root sold on the basis of ether extract, for example, *D. malaccensis* from the Kinta District. At present there is only a small demand for such root, which is used for mixing with root rich in rotenone to give a blend as required for a certain purpose. The solvent extract from this root, mixed with pyrethrum extract, is also used to some extent in the preparation of sprays against household insects, for example, flies and gnats.

In April 1938 the current price for derris root of 18 per cent. ether extract was about 10 cents per lb., c.i.f. New York, compared with 14 cents per lb. for root sold on a 5 per cent. rotenone basis. Since that date the price of this root has declined to about 7 to 8 cents per lb., this figure being somewhat nominal.

Derris Elliptica, Changi No. 3, Root.

All parties were particularly interested in the results of our selection work with the above type and were surprised to learn of the high rotenone content of the roots of some of our clonal material. As stated previously, the toxic content figures are of the order of 12 per cent. rotenone and 25 to 30 per cent. ether extract, calculated on a moisture-free basis.

At present, it is extremely doubtful whether a market exists for such a high quality root at a price commensurate with its toxic content based on either rotenone or ether extract.

The bulk of the derris and cube root as imported is used in the form of dust, being diluted with the requisite amount of inert material, for example talc or clay, to a definite rotenone content say 0.75 per cent. For such purposes a high rotenone content is rather a disadvantage. In the first place much more of the diluent is required. Thus, assume that a finished dust containing 0.75 per cent. rotenone is required. With a ground root of 5 per cent. rotenone content approximately 600 lbs. of the diluent would be necessary for each 100 lbs. of powder but with ground root containing 12 per cent. rotenone no less than 1500 lbs. of diluent would be required.

Secondly, the more diluent that is added the more thorough must be the mixing to ensure an even distribution of the powder throughout the mass. This applies more particularly to the farmer or market gardener who may carry out the mixing of the powdered root and diluent himself on a cement floor using only a shovel or other similar implement.

Thirdly, even with satisfactory mixing, there is a smaller chance of a direct hit on an insect owing to the smaller number of toxic particles in the mass.

Fourthly, in the case of the high quality root, mixing would have to be carried out close to the place where the insecticide was required. It would be uneconomic

to pay heavy freight charges payable on insecticide containing such a large proportion of inert material which itself would be transportable in bulk at much lower rates.

Although the disadvantage of diluting with such a large amount of inert material might be avoided by a preliminary blending with root of low quality, for example, *D. malaccensis* from the Kinta District, to the present standard, this presumes a large supply of low quality root to be used merely as a diluent and for which manufacturers would only be prepared to pay accordingly.

The cultivation of two distinct qualities of root would be most unsatisfactory from the point of view of general agricultural practice; it is extremely unlikely that support for the low quality root would be forthcoming, in fact it would be contrary to the best interests of the industry.

Under such conditions it would appear preferable to consider the development of another type, *D. elliptica*, Sarawak creeping, which is characterised by a remarkably high yield of root combined with a moderate toxic content, rotenone 6 per cent. and ether extract 18 to 20 per cent. It is understood that such root would be most acceptable to insecticide manufacturers for use in the preparation of a dust.

As far as could be ascertained, the real future of high grade root, such as *D. elliptica*, Changi No. 3 lies either in the preparation of impregnated dusts or oil emulsions. In the case of impregnated dusts, the powered root would be solvent extracted and the extract mixed with the inert material, possibly exhausted or partially exhausted ground root from a previous extraction. Evaporation of the solvent would leave an impregnated dust. An oil emulsion would be prepared by making a solvent extract and after evaporation of the solvent suspending the residual resins in a mineral oil by means of a stabiliser.

There is one serious drawback to the use of a vegetable insecticide, such as derris or cube, namely the comparatively rapid deterioration in toxicity of the material when exposed to light and air. The research staffs of various organizations are working on the problem of the addition of anti-oxidants or preservatives to insecticidal preparations having derris and cube as a basis, with the object of inhibiting this deterioration. It will be realized that if a successful preservative is discovered a much wider field for these insecticides will be opened. It may then, for example, be possible to use them against the codling moth on apples to the exclusion of arsenical preparations.

Enquiries were made regarding the possibility of extracting only the rotenone from *D. elliptica*, Changi No. 3 root and marketing it as such. There is, however practically no demand for pure rotenone as an insecticide. As far as could be ascertained its sole application had been in moth-proofing materials such as fur-coats and carpets, the rotenone being dissolved in a solvent, for example, ethylene dichloride, and the material sprayed with the solution.

In view of the overloaded and falling state of the market, manufacturers were unwilling to commit themselves as regards the price which such high quality root as *D. elliptica*, Changi No. 3 might be expected to command compared with root

of 5 per cent. rotenone content. A tentative suggestion was one cent for each additional per cent. of rotenone over 5 per cent. Assuming the present price of derris of 5 per cent. rotenone content to be 11 cents per lb., *D. elliptica,* Changi No. 3 root with 12 per cent. rotenone would be worth about 18 cents per lb. Other manufacturers said that, assuming the present method of applying derris dust to continue, the price would be too high compared with the standard product. If, however, a demand arose for high quality root either for impregnated dusts or oil emulsions, there might well be such a price spread between the two qualities, since solvent extraction would only be an economic process for the high quality root.

Discussion on Results of Investigation.

The present prospects for Malayan derris in the United States cannot be considered bright.

While the product is popular as an insecticide, severe competition with cube has reduced the price to such an extent that little or no profit is left for the cultivator. The present price of 11 cents per lb. c.i.f. New York, after allowing say 4 cents per lb. for freight from Malaya to United States, corresponds to approximately $17 per picul (Straits currency) for root delivered in Singapore.

The future trend of the market is also difficult to foresee. It depends upon whether supplies of cube are maintained at the present low price, also whether fresh applications for both derris and cube are discovered, particularly for material rich in rotenone. If the bulk of both products continues to be used as dust it is possible that a medium quality root, such as *D. elliptica,* Sarawak creeping, with its high yield of root may be the most suitable for general cultivation. Much depends, however, on whether a strain of *D. elliptica,* Changi No. 3, can be evolved in which high yield of root can be correlated with high toxic content.

In view of the present low price of derris and the high proportion which the shipping charges bear to the price of the root, enquiries were made as to whether Malaya would be better advised to consider the possibility of grinding the root locally and exporting the powder, thereby following the example of Brazil with cube root. Although such a procedure would result in a reduction of shipping charges, there are certain disadvantages, for example, the cost of machinery, the health hazard and the *ad valorem* tax on entry into the United States.

Laboratory experience has shown that it is much more difficult to reduce derris root to a powder than cube root, the latter being of a soft spongy nature compared with the hard fibrous derris root(2). This view is confirmed by New York importers, who state that the machinery required for the efficient grinding of derris root is both intricate and expensive. For example, the latest type percussion mills, which are used for this purpose, are water-cooled to prevent the material from becoming too hot, thereby avoiding the possibility of any decomposition in the resins. It has been found that if the material heats too much during the grinding there is a decrease in the rotenone content. This confirms results obtained in this

laboratory some years ago when it was found that if powdered root were dried in a vacuum oven at 80°C. before analysis, a lower rotenone content was found than if air-dry powder were used.

One of the latest type percussion mills may cost as much as $25,000 (United States currency). In view, therefore, of the high cost of machinery, it is more than probable that a central organization would have to be formed to carry out the grinding of the root and the blending of the product. It would undoubtedly be more economical in the long run to have one large mill working continuously and maintaining a standard product rather than a number of small mills running intermittently.

The health hazard is considered somewhat serious in the United States. Particular care is taken to maintain all parts of the mill in an air-tight condition to avoid throat affections of the workers owing to the fine dust floating in the atmosphere.

The 10 per cent. *ad valorem* tax has been mentioned previously.

Although the export of ground derris root would affect some of the American importers who have installed special mills for this purpose, there seems little doubt that it is inopportune principally on account of expense and uncertainty regarding the future trend of the market, to suggest such a radical change in the mode of packing and shipment. It would appear preferable for the present to endeavour to raise the quality of the root by planting only selected material, thereby eliminating to a large extent the present variability.

Shipping charges may also be reduced by chopping the root into short lengths before baling. This enables a much greater weight of root to be compressed into a bale of given dimensions; for example in a bale of 42″ x 30″ x 28″, 240 lbs. of chopped root can be packed compared with 175 lbs. of whole root. Attention has been drawn in a previous number of this journal to the question of baling chopped root.(3)

Research Work on Vegetable Insecticides in the United Kingdom.

On his return to England the writer was invited to attend a meeting of the Imperial Institute Consultative Committee on Insecticidal Materials of Vegetable Origin to give an account of his visit. This Committee is part of the organization recently established in the United Kingdom for dealing with the question of these insecticides.

A brief summary of the developments to-date is as follows:—

At a meeting held in July 1937 at the Colonial Office, the Colonial Advisory Council of Agriculture and Animal Health decided that in view of the growing importance of vegetable insecticides, co-ordination was essential between the organizations engaged in research work in connexion with such products.

The organizations are:

(a) Imperial Institute.
(b) Rothamsted Experimental Station.
(c) Department of Agriculture, Straits Settlements and Federated Malay States.

(d) East African Agricultural Research Station, Amani, Tanganyika Territory.

(e) Department of Agriculture, British Guiana.

The Council also considered that the work already in progress at the Rothamsted Experimental Station should be extended by the recruiting of additional staff, grants to meet the necessary expenditure being obtained from the United Kingdom Development Fund and the Colonial Development Fund.

An organic chemist and an entomologist have been recruited and a three-year programme of work laid down. It was decided to concentrate work on the rotenone (and allied substances) content of vegetable insecticides, notably derris. The main lines on which investigations are proceeding are as follows:—

(a) The various analytical methods for determining rotenone with a view to arriving at some method which could be accepted as a standard and which would give uniform results in the hands of all workers.

(b) The other toxic materials which occur in derris with the object of throwing some light on the toxic substances which occur as precursors of toxicarol, deguelin and other compounds which have been isolated from derris.

(c) The devising and standardization of satisfactory biological methods for testing the toxicity of insecticides such as derris.

Arrangements have also been made whereby the results obtained are made available to workers of the other organizations engaged on research on the same lines.

The writer attended a meeting at the Imperial Institute to discuss the question of the adoption of a standard method for the determination of rotenone, while he also visited the Rothamsted Experimental Station in connexion with work on this subject.

In addition, as indicated above, the Imperial Institute has set up a Consultative Committee on vegetable insecticides, one of the functions of which is to maintain touch with the commercial interests involved with a view to providing reliable information concerning the future supply and demand for such materials.

A monograph on the subject of insecticidal material of vegetable origin is in course of preparation by the Committee, who also issue a quarterly bibliography of all literature on this subject

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(2) Georgi, C. D. V. The Toxic Content of Haiari or Cube Root. *Malayan Agricultural Journal*, Vol. XXV, No. 8, August, 1937, p. 334.

(3) Georgi, C. D. V. A New Method of Harvesting, Drying and Sampling Derris Root. *Malayan Agricultural Journal*, Vol. XXV, No. 10, October, 1937, p. 425.

Received for publication 31st December, 1938.

QUARTERLY REPORT ON THE MALAYAN PINEAPPLE INDUSTRY, SEPTEMBER-NOVEMBER, 1938.

Prepared by the Economics Branch from Reports of Field Officers.

Factories.

The centres of the Malayan pineapple canning industry are Johore, Singapore and Selangor. There are 5 registered factories in Singapore, 6 in Johore and 3 in Selangor. Of the 5 factories in Singapore, 3 are in regular production, 1 has been closed down since July, while at the fifth factory work has been confined to the experimental packing of pineapple juice. Fruit supplies in Johore during October were only sufficient to permit of 3 factories working, but in November increased supplies resulted in a further 2 factories working. In Selangor, only one factory operated throughout the quarter.

Areas.

The area planted with pineapples has declined during 1938. It is estimated that there are now only 2,700 acres planted in Singapore. This decline is attributed to poor soil conditions, and to the very low prices which have prevailed until recently. It is unlikely that this acreage will be extended, owing to the growing demand for food crops, and Singapore factories will soon depend entirely on Johore for their supplies of fruit.

Returns of areas under pines in Johore show that 43,177 acres are planted as a sole crop and 6,085 acres as a catch crop, giving a total of 49,262 acres. Deterioration of pineapple land is apparent in the older planted areas and it is questionable whether these areas can continue to produce marketable fruit much longer.

Consideration is being given by some growers to the possibility of converting their lands to rubber under the new rubber planting conditions. If this conversion takes place it is probable that at least 10,000 acres will be affected.

There has been a reduction of planted area in Selangor this year of about 2,000 acres, old areas being cut out in favour of other crops owing to the low price of pines for canning. The present area is 6,909 acres, of which 2,245 acres are planted with pines as a sole crop.

The present total area of pineapples for canning is therefore about 59,000 acres, as compared with about 70,000 acres a year ago. It is not anticipated, however, that there will be any serious diminution of supplies, the present area being sufficient to maintain the industry at about its present level.

Production.

In November, Singapore production was approximately 17,000 cases a week. Exports of canned pineapples from Johore for the first 10 months of 1938 amounted

to 64,608 tons, and the estimated export for 1938 from this State is 74,000 tons, a decrease of 6,000 tons over 1937. During the quarter September-November 1938, 28,347 cases of pines were sold from Selangor factories.

In the first nine months of 1938, the total exports of pineapples from Malaya amounted to 59,987 tons (or 1,937,012 cases) valued at $5,915,235 (about £696,000), as compared with 68,773 tons (2,222,451 cases), valued at $7,560,083 (£889,400) during the corresponding period of 1937.

Prices.

A Central Board of Pineapple Packers is in process of formation. The main objects of the Board are to control production to meet the demands of the market, and to fix the price of the canned product at a level which will ensure a fair profit to growers and packers. The arrangements for the functioning of the Board appear to be working smoothly.

Prices during the quarter under review have necessarily been somewhat uncertain and The Singapore Chamber of Commerce has ceased to quote prices in their weekly circular, contenting themselves by noting that prices are nominal. The present intention of the Board is to fix the basic price of 1½ lb. standard cubes at $3.00 per case of 48 cans and the quota for the present short cropping season at 850,000 cases, the season period extending from October 17th, 1938 to March 31st., 1939. Stocks of canned pineapples in Malaya are necessarily high during this reorganization of the market, but as reports place London and Liverpool stocks at the lowest figure for several years, it may be anticipated that deliveries from Malaya will increase in the near future.

An Association of Growers is in process of formation and agreement has been reached on a code of rules for this Association. It is anticipated that this Association will be able to safeguard the interests for the producers of fruit.

Abstract.

THE EXPORT CROPS OF THE NETHERLANDS INDIES IN 1937.

Bulletin No. 157 of the Central Bureau of Statistics of the Netherlands Indies.

The trade recovery started in 1936 was well maintained in 1937; the volume of the agricultural exports exceeded that of 1936 by 21 per cent. and in value by 82 per cent.

Of the total value of the 1937 exports of agricultural produce, amounting to Gs. 660 millions, Gs. 358 millions or 54¼ per cent. was estate produce and Gs. 302 millions or 45¾ per cent. was native produce. The proportionate increase of the native produce, already discernible in the last few years, has been greatly accentuated.

Expressed in percentages of total world exports of important agricultural exports the 1937 exports from the Netherlands Indies were: cinchona 90 per cent., pepper 79 per cent., kapok 70 per cent., rubber 38 per cent., copra 30 per cent., agave-fibre (sisal) 23 per cent., oil palm products 20 per cent., and tea 17 per cent.

Cane Sugar.

The area planted with pedigree cane to serve as planting material was 4,804 hectares* and the crop from 365 hectares of this area had to be milled. This is slightly below the average of about 5,200 hectares for the last five years. Production from the total planted area of 83,659 hectares was 1,379,924 tons†— more than twice the average of about 607,000 tons of 1934-36. Total exports were 1,128,134 tons. Cane sugar production for the year 1937-38 is estimated to be 7.4 per cent. of the world's total cane sugar production.

Native-owned area producing sugar for home consumption increased from 12,909 hectares in 1936 to 14,447 hectares in 1937.

Rubber.

The estate planted area was 593,736 hectares, 534,571 hectares of which were in bearing. A total area of 13,914 hectares of old rubber was cut out and 13,184 hectares were planted with superior material. Of the total area planted 165,879 hectares (28 per cent.) are budded rubber, 84.3 per cent. of which was planted before 1934.

The native-owned planted area in Java contains nearly 8 million trees, 61 per cent. of which are tappable. For the native-owned planted area in the Outer Provinces the figure given a year ago have remained unaltered.

* 1 hectare = 2.472 acres.

† Throughout this Abstract, "ton" refers to the metric ton of 2,200 lbs.

Total exports in 1937 were: estates 245,044, native 208,551, total 453,595 tons.

The quality of the native product exported continues to improve and the percentages for first, second and third quality in 1937 were respectively: 87.4, 0.4 and 12.2 per cent. This improvement is due partly to the fact that for export of wet rubber, coupons for the full wet weight have to be surrendered. This policy has greatly stimulated the activity of the local remilling factories. From 1933 to 1937 their number rose from 23 to 52 and their output from 10,105 tons to 58,455 tons.

Coffee.

The planted estate area was 107,171 hectares, 84¼ per cent. of which is in Java; the area of native-owned plantations in Java was 23,423 hectares; the area of the latter in the Outer Provinces is not known, but must be considerable. Estate production was 62,404 tons and the export of native-grown coffee from the Outer Provinces was 69,627 tons, 92 1/3 per cent. of which came from Sumatra. The bulk of the production (93.2 per cent.) is Robusta coffee.

Tea.

The planted estate area was 139,034 hectares, 75½ per cent. of which is in Java and 98 per cent. of which is in bearing. No native tea is grown outside Java. In Java the native-owned area was 67,501 hectares, of which 4,227 hectares have been abandoned. Of the remaining 63,274 cultivated hectares, 98¾ per cent. are in bearing. The total quantity of estate produce, including 12,170 tons dry weight of purchased native-grown leaf, representing a value of Gs. 4,831,151 was 74,516 tons.

Tobacco.

The particular features of this cultivation and of the preparation for export were fully described in Vol. XXII (1934) of this Journal.

The estate crop of the high grade leaf for cigar wrappers, which is confined to the East Coast of Sumatra, was 14,153 tons. In Java and Madura estate cultivation of cheaper grades and the European-managed curing establishments of purchased native-grown leaf produced a crop of 14,651 tons of "leaf tobacco" and 18,670 tons of "crude tobacco."

Further, there is a large native production for home consumption and its export surpluses in 1937 were 16,496 tons for Java and 1,380 tons for the Outer Provinces.

Cinchona.

The 1937 production of dried cinchona bark was 10,425 tons. Export of native-grown bark was 93 tons and the Bandoeng quinine factory further purchased nearly 10 tons of native bark with an average percentage of 3.53 and a quinine equivalent of 343 kilogrammes.

New restriction regulations came into force on 1 January 1937.

Oil Palm Products.

Of a total planted area of 83,278 hectares, 70,213 hectares are in bearing. Production amounted to 199,092 tons of oil (inclusive of kernel oil) and 41,826 tons kernel. Exports were respectively 196,895 and 41,471 tons. Of the total planted area 91.7 per cent. is in Northern Sumatra where the yield of oil per hectare in bearing is now 2,896 kilogrammes.

The Netherlands Indies in 1937 contributed fully 40 per cent. to the world's exports of palm oil and 5.9 per cent. of kernels.

Copra.

The estate area in bearing is: Java 5,880 hectares and Outer Provinces 32,531 hectares, together producing 32,065 tons copra equivalent. In addition, 1,342 tons copra equivalent of native produce was purchased and worked.

Domestic consumption in Java and Madura in 1937 for the first time in four years did not require an import surplus; the export surplus has been 36,182 tons copra equivalent, the bulk of which was native-grown produce.

The local oil mills in Java and Madura in 1937 milled 193,633 tons of copra for home consumption of coconut oil and those in the Outer Provinces 20,592 tons of copra. These figures do not include domestic consumption of nuts for culinary purposes and for oil extraction in the small native village oil mills.

The export surplus from the Netherlands Indies in 1937 was 498,241 tons of copra, nearly all of which came from the Outer Provinces. The copra equivalent of oil and nuts amounted to 46,797 tons, making a total of 545,038 tons of copra equivalent exports.

Essential Oils.

The 1937 export of citronella oil was 1,419½ tons. Exports of other essential oils were: cajuput-oil 72½ tons, vetiver oil 20 tons, patchouli oil 22 tons; in addition to this 1,155 tons of dried patchouli leaf was exported to Singapore and Penang distilleries.

Hard-rope Fibres.

Chiefly sisal, grown on estates. The 1937 export—not including refuse—was 85,231 tons.

Kapok.

This crop is almost entirely native grown and the bulk of the exports are from Java. The total 1937 exports were: fibre 19,018, seeds 19,465, oil 3,239 and oilcake 17,887 tons.

Only *Ceiba pentranda* L. is cultivated.

Pepper.

The 1937 exports were:—

	Black	White (in tons)	Total
Sumatra	19,914	776	20,690
Banka and Billiton	567	8,960	9,527
Borneo	73	2,309	2,382
	20,554	12,045	32,599

as against a total of 77,582 tons in 1936.

Tapioca.

The planted native area of 950,000 hectares as well as the production of 7,637,000 tons of fresh tubers and the export surplus of 1,280,000 tons of fresh tubers are record figures.

This crop is almost exclusively grown by natives in Java for home consumption; the planted estate area and production are relatively insignificant.

The 1937 exports were: dried tubers 20,935 tons, dried and ground 172,644 tons, flour 203,021 tons, flake and siftings 7,263 tons, pearl and seed 13,166 tons, fibre residue 24,239 tons.

Derris.

The export of dry roots fell from 318 tons in 1935 to 131 tons in 1937. In 1937 the total planted area was 2,305 hectares of which 610 were in bearing.

Gambier.

This crop is mostly native-grown in the Outer Provinces which in 1937 exported 6,118 tons to foreign countries and 4,051 tons to Java. Estate production was 3,335 tons.

Nutmegs.

No reliable figures for planted area, production and home consumption are available. The 1937 exports were: shelled nuts 2,052 tons, unshelled nuts 2,363 tons, mace 709 tons. The Banda Islands group is the chief supplier.

Arecanuts.

This is entirely a native crop. In 1937 exports from Java were 7,002 tons and from the Outer Provinces 49,388 tons.

Cloves.

The 1937 exports from the Outer Provinces to Java were 520 tons and to foreign countries 521 tons. Java imported further 4,410 tons, chiefly from Zanzibar.

Rice.

Java, with a crop of 3,944,430 tons of husked rice from a harvested area of 3,867,000 hectares in 1937, for the second time had an export surplus, this time amounting to 197,563 tons. Most of it went to the Outer Provinces.

The Outer Provinces in 1937 had a net import surplus of 344,517 tons, so that the net import surplus of the whole of the Netherlands Indies was 146,954 tons for a population of about 65 millions. Bali, Lombok and Celebes always have a surplus available for export to other parts of the Outer Provinces.

Maize.

Of Java's crop of 2,036,900 tons of husked grain from a planted area of 2,069,000 hectares, 140,012 tons were exported to foreign countries. The Outer Provinces in 1937 exported 72,475 tons to foreign countries. Practically all of this came from Celebes.

Groundnuts.

Exports to foreign countries in 1937 amounted to 55,229 tons of decorticated nuts from Java and 7,252 tons from the Outer Provinces.

Soya Beans.

In Java, cultivation and production are still increasing and from a crop of 268,900 tons of dry beans 15,250 tons were available for export, mainly to the Outer Provinces. There, too, production is increasing and imports decreasing.

Sago.

The 1937 exports to foreign countries were 37,716 tons mainly from the East Coast of Sumatra and the Rhio Islands.

Miscellaneous Crops.

The 1937 exports of a number of minor crops were, in tons:—

Benzonin Gum	...	1,852	Gutta Percha	...	2,688
Cassia	...	2,368	Illipe, Nuts	...	787
Chillies	...	2,515	,, Fat	...	11
Cocoa	...	1,340	Kratok Seed	...	2,336
Cotton, cleaned	...	969	Onions	...	2,977
,, uncleaned	...	3,032	Ricinus	...	6,688
,, seed	...	1,481	Sesamum	...	3,377
Cubebs	...	201	Tamarind	...	2,149
Fruit, fresh	...	9,247	Vegetables, fresh	...	11,339
,, dried	...	2,157	,, dried	...	533
,, canned	...	317	Potatoes	...	1,067

L.A.J.R.

Reviews.

British Breeds of Live Stock.

Bulletin No. 86 Ministry of Agriculture and Fisheries. Sixth edition. October, 1938. 152 p.p. illustrated. H.M. Stationery Office, London. 4s. 6d.

This book describes and illustrates all the recognised British breeds of live stock and will therefore have a very wide appeal in view of the extensive distribution of the progency of British stock.

The existence of the numerous and specialized breeds in Britain is accounted for by the very wide range of climate, altitude and soil. The Foreword reminds us that "Great Britain has for many centuries been the home of excellent breeds of all kinds of stock. Some of these breeds have proved themselves so eminently suited to the conditions of their native districts that they have long remained comparatively unchanged. Other breeds, however, have been subjected to selective improvement at the hands of notable breeders in an attempt to increase both the quality and the quantity of the meat, milk or wool they produce, or as regards horses, to improve their speed, stamina, size and strength, and thus meet modern requirements."

The wide range of British stock is shown by the fact that this book describes 20 breeds of horses, 28 of cattle, 33 of sheep, 12 of pigs and 6 of goats. The descriptions of the various breeds have been supplied by the Breed Societies, but the reader is also given much additional information, concisely stated, on such points as origin of breed, distribution, and particular points in favour of each breed.

The inclusion of a list of Breed Societies together with the principal places for public sales, exhibitions and shows, which is given at the end of the book, was a happy inspiration, for it will enable breeders throughout the world to get into direct touch with reputable sellers of any breed.

A word of praise must be added for the excellence of the illustrations—over 100 in number. Doubtless, the inclusion of this large number of illustrations is responsible for the relatively high price of the book, but the value of the volume is greatly enhanced by their inclusion. The price, however, is only expensive in comparison with other publications of the Ministry of Agriculture. The reviewer confidently recommends this book to the stock breeder and keeper; it will prove to be the cheapest and most valued book on his shelf.

D.H.G.

Journal of the Rubber Research Institute of Malaya.

Vol. 8 No. 3. November 1938. Published by the Rubber Research Institute, Kuala Lumpur. Price 50 cents (Straits currency).

The following are the more important articles included in the current number of the Journal of the Rubber Research Institute of Malaya.

The Effect of *Lalang* on Growth of Young Rubber Trees.

Oidium Heveae by F. Beeley.

Experiments with Economic Tapping Systems (1): Part VII by C. C. T. Sharp.

Prevention of Mould Growth on Sheet Rubber during Storage by J. D. Hastings and J. H. Piddlesden.

Experiments with a New Type of Smoke-house by J. H. Piddlesden.

Plasticity and the Colour of Sheet Rubber by J. D. Hastings.

The Constituents of Hevea Latex Parts V and VI by K. C. Roberts.

Latex Preservatives: 1. Some Preliminary Experiments with Sodium Pentachlorphenate—"Santobrite" by Edgar Rhodes.

Notes on a Visit to Indo-China by J. H. Piddlesden.

Creaming Latex with Synthetic Creaming Agents; and Creaming Latex with Tamarind Seed Powder by Edgar Rhodes and K. C. Sekar.

Rubber Statistics 1900-1937.

Barker, P.W. and Holt, E.G. Trade Promotion Series No. 181 U.S.A. Government Printing Office, Washington 1938. 54 pp. Price 10 cents gold.

This publication of the statistics of production, absorption, stocks and prices of rubber over a period of 37 years will be found useful for easy reference. It is not possible to obtain from any other reference book all the basic statistical data necessary to a study of the development of the rubber manufacturing industry from 1900 to 1937; as a matter of fact, information on such an important subject as the price of the prime raw material of the industry is not readily available from any one source.

This small book is recommended to manufacturers, importers, dealers, and other interested in the rubber trade.

Departmental.

FROM THE DISTRICTS.

December, 1938.

The Weather.

The weather was unseasonably dry over the whole country for the greater part of December. In the West Coast regions rain occurred during the last week of the month.

Kelantan continued to experience good falls of rain, though in inland districts the average for the month was below normal.

In Pahang weather conditions were similar to those experienced on the west coast but in coastal districts, very heavy falls of rain in the last days of the month caused floods.

In Jelebu, Negri Sembilan, heavy rain occurred throughout the month.

In Johore the total precipitation was below average except in Johore Bahru. In Singapore and Johore Bahru conditions were normal.

Crop Reports.

Rubber.—The level of market prices for this commodity remained almost the same as in the previous month. There was not much tapping carried out on small holdings. In Selangor, however, it is reported that activity has recommenced, and tapping was general with the intention of accumulating a stock of rubber for sale with the new issue of coupons in the first quarter of 1939.

In Kedah the sale of coupons by owners of small estates and small holdings is giving rise to much unemployment.

Small-holders are taking an increasing interest in the planting of new land and planting rights have risen in value. In Selangor share certificates are now reported to be difficult to obtain and rights to plant one acre are now worth $31. It is reported that a large number of share certificates have gone over to Pahang, where Chinese have taken up new areas.

In Selangor also considerable interest is being taken in replanting. Six multiplication nurseries have already been established in Ulu Langat, and an order for 4,300 clonal seeds has been effected for small holders in this District.

The co-operative rubber marketing groups at Sijangkang, Ijok and Bandar in Selangor continue to function satisfactorily. The last two groups are now undertaking co-operatively the bulk coagulation of latex and manufacture of sheet. A further group is in process of organization at Jendram.

In Kelantan a survey of areas which formerly produced almost solely lump rubber indicates that production of this form of rubber has nearly ceased. At the present time uncouponed lump rubber is worth only $1.50 per picul. Good quality smoked sheet (Chinese Prime) commands a premium of $3.50 to $3.75 per picul.

Unsmoked sheet continued to be the most general form in which sheet rubber was disposed of in Johore, and in several districts all small smoke houses were idle.

Padi.—The dry weather does not appear to have affected adversely the padi crop; in fact, where the crop has reached the harvesting stage the absence of rain was a great advantage. In the Jelebu District, where considerable rain fell throughout the month, the harvest was held up.

Reports from Kedah state that the crop as a whole is very satisfactory, though a few areas which were affected by floods earlier in the season will not do so well. In North Kedah a large part of the crop has already been reaped.

Harvesting is also in full swing in Pahang. During the present season the weather conditions in this State have, as far as padi is concerned, been most unfortunate. When the heavy rains occurred on the east coast at the end of December most of the crop, however, had been harvested.

Pineapples.—Fruit supplies continue to be plentiful but by the end of the current month the season should be on the wane. The lull in buying, which occurred when the Central Board first commenced operations, has now terminated. Stocks in England are said to have been almost exhausted. During December buyers in the United Kingdom placed large orders for canned pineapples and exports were heavy.

Poultry.—Outbreaks of poultry disease have occurred in several parts of the country. In Malacca bad epidemics have been reported. In Krubang mukim the attack has been particularly severe, poultry over large areas being completely wiped out. The villagers restock with chicks from Chinese hatcheries

DEPARTMENTAL NOTES.

Demonstration Canning Factory.

The machinery for the new Demonstration Canning Factory and Research Station, Johore Bahru, has now arrived or in expected shortly and the work of installation is progressing rapidly. It is hoped that most of the machinery will be installed by the end of January. The Factory and Station is in charge of Mr. W. J. B. Johnson, Canning Officer, of this Department.

Visitors to the Ayer Itam Agricultural Station, Penang.

The Agricultural Officer, Province Wellesley and Penang, reports that 229 persons visited the Station during December. A large number of visitors is gratifying, but may prove a source of embarrassment. The visitors to the Station are most numerous on Sundays when they arrive in such numbers that they are difficult to control; while, for example, one party is being conducted round the pig sties, another is possibly tasting the rambutans, and a third, in an endeavour to see how bud-grafting works, is quite likely to remove the scions from the stocks!

Profit from Fruit Orchards.

The State Agricultural Officer, Pahang, in his report for December points to the profits that are possible in that State from a well-run orchard within reasonable proximity to a large town. He instances one such orchard of 5 acres, where rambutans of good quality are the fruit chiefly grown. Soil erosion is guarded against, the trees are pruned and regularly manured with groundnut cake, and an average annual production of 150,000 fruits from the orchard is obtained. The sale price ranges from 50 to 70 cents per 100 fruits. The gross annual income from the orchard is from $300 to $500, while as much as $800 was obtained one year.

The raising of improved planting material of fruits is a feature at all suitable Agricultural Stations throughout the country, and the demand for planting material has been strong for some time, proving that orchard owners are alive to the importance of obtaining good stock and confident of the quality of material supplied from the Stations.

Appointment.

Mr. B. Bunting, Senior Agriculturist, has been appointed to act as Chief Research Officer, with effect from 21st December 1938 inclusive.

Leave.

H. H. Tunku Yacob bin Sultan Abdul Hamid returned from leave and resumed duty as Principal Agricultural Officer, Kedah, with effect from 1st December 1938.

FERTILIZER PRICES, DECEMBER, 1938.

The following are the prices at the end of December, 1938, of some of the more important fertilizers.

Product.	Analysis				Price per ton $
	Nitrogen (N)	Phosphoric Acid (P_2O_5)		Potash (K_2O)	
		Soluble	Insoluble		
Sulphate of Ammonia ...	20.6	—	—	—	72.75
Calcium Cyanamide ...	20.6	—	—	—	80.00
Muriate of Potash ...	—	—	—	50	112.00
Sulphate of Potash ...	—	—	—	48	112.00
Superphosphate (concentrated) ...	—	39 - 40	—	—	105.00
Superphosphate ...	—	16 - 18	—	—	60.00
Basic Slag ...	—	16	—	—	48.00
Rock Phosphate (Christmas Island) ...	—	11*	38‡	—	33.50
Rock Phosphate (very finely ground Gafsa) ...	—	11*	26 - 28‡	—	40.00
Lime ...	—	—	—	—	20.00

* Citric soluble. ‡ Total

Quotations are *ex* warehouse, Port Swettenham, Klang, Singapore and Penang, with the exception of muriate of potash which is *ex* warehouse, Port Swettenham, Klang and Singapore.

The above quotations for concentrated superphosphate, superphosphate and Christmas Island phosphate are *ex* warehouse Penang, Port Swettenham and Klang. The Singapore quotations for these three fertilizers are $95, $50 and $31.50 per ton respectively.

Statistical.

MARKET PRICES.

December, 1938.

Major Crops.

Rubber.—The Singapore price for No. 1 X. Rubber Smoked Sheet varied between 27¼ and 28¼ cents per lb. Average prices per lb. for the month were:—Singapore 27.75 cents, London 8.01d., New York 16.01 cents gold, as compared with 27.96, 8.15d. and 16.01 cents gold respectively in November.

Prices paid for small-holders' rubber at two centres during December are shown in Table I.

Table I.

Weekly Prices Paid by Local Dealers for Small-Holders' Rubber, December, 1938.

(Dollars per picul of 133 1/3 lbs.)

Grades	Kuala Pilah, Negri Sembilan			Batu Pahat, Johore.			
	8	15	29	7	14	21	28
Smoked Sheet ...	34.40	34.20	—	—	—	34.53	—
Unsmoked Sheet ...	33.00	33.00	33.50	32.86	31.50	32.97	30.61
Scrap ...	No purchases						

Transport by F.M.S.R. lorry service Kuala Pilah to Seremban 12 cents per picul, to Malacca excluding duty, 25 cents per picul, by rail Seremban to Penang $1.24 per picul, Seremban to Singapore $8.00 per ton.

Transport from Batu Pahat to Singapore by lorry excluding duty, 90 cents per picul.

Transport from Kuala Kangsar to Prai by railway $6.20 per ton.

Transport from Kuala Kangsar to Singapore by railway $10.00 per ton (minimum consignment 5 tons).

At Kuala Pilah the standard deduction for moisture in unsmoked sheet is 5 per cent.

At Kuala Kangsar the standard deduction for moisture in unsmoked sheet is 10 per cent.

No purchases of rubber at Kuala Kangsar during the month, or at Kuala Pilah on 22nd December.

Palm Oil.—Prices in December showed little variation over those ruling during the previous month. The average of weekly quotations per ton in November were:— palm oil £13-4-2, kernels £8-3-4. Prices in December are shown in Table II.

Table II.

Prices of Palm Oil and Palm Kernels.

Date 1938.	Palm Oil in Bulk, c.i.f. landed weight Liverpool/ Halifax.	Palm Kernels, c.i.f. landed weight London/ Continent
	per ton	per ton
December 9	£ 13. 5. 0 Montreal	£ 8. 7. 6 Amsterdam
,, 16	13. 0 0 Liverpool	8. 10. 0 Holland
,, 23	13. 0. 0 ,,	8. 10. 0 Rotterdam
,, 30	13. 0. 0 ,,	8. 10. 0 ,,
Average	£ 13. 1. 3	£ 8. 9. 4

Copra.—The upward tendency of prices towards the end of November was maintained during December. The average Singapore price per picul for sun-dried in December was $3.28, while the mixed grade averaged $2.97 per picul. Corresponding average prices in November were $3.06 and $2.73 per picul.

Copra cake prices dropped early in the month from $2.05 per picul to $1.60. The average price per picul in December was $1.69.

Rice.—The average Singapore wholesale prices of rice per picul in November were as follows:— Siam No 2 Ordinary $4.40, Rangoon No. 1 $3.50, Saigon No. 1 $3.90, as compared with $4.47, $3.70 and $4.07 respectively in October, and $4.12, $3.92, and $3.82 respectively in November 1937.

The average retail prices in cents per gantang of No. 2 Siam rice were:— Singapore 28, Penang 32 and Malacca 30.

The average declared trade value of imports during November was $3.85 per picul, as compared with $4.00 per picul in October 1938, and $4.09 per picul in November 1937.

Padi.—Prices have eased in Kedah and Malacca. The Kedah price was $12 to $12.60 per 160 gantangs, the mills paying $2.10 per picul, but bought at around $1.90 per picul when the new crop was harvested. Prices in Perak were around those of the previous month. In Malacca padi was $7 to $8 per 100 gantangs as compared with $10 to $11 in the previous month. Johore prices varied between $11 and $14 per 100 gantangs

The Government Rice Mill, Krian, Perak, paid $2.30 per picul, and the Government Rice Mill at Temerloh, Pahang, from $2 to $2.25 per picul.

Pineapples.—The Singapore prices per case of canned pineapples were as follows:— G.A.Q., Spiral $2.90, Round $3.80, Cube $3.00; Golden $3.20, $4.00, 3$.25 respectively. Sales for December were 500,000 cases, the bulk of which was sold between 15th and 24th. Latest reports state that good business continues for both nearby and forward.

The Singapore price of fresh fruit for canning was $1.00 to $1.80 per 100. In Johore south, the prices were per 100: 1st quality $1.50 to $1.20, 2nd $1.10 to 90 cents, 3rd 95 cents to 60 cents. The Selangor price was from 50 to 80 cents per 100 fruits.

Beverages.

Tea.—Six consignments of lowland tea, comprising 327 packages were sold on the London market during December, at prices ranging between 10¾d. and 1s.0¼d. per lb., the average price being 11.38d. per lb. During the month three consignments of upland tea, comprising 348 packages were also sold in London at prices ranging between 1s. 1¾d. to 1s. 2½d. per lb., the average price being 1s.2.08d. per lb.

According to *The Tea Brokers' Association of London Reports* for December, the average London prices per lb. realized during the month for tea from other countries were as follows:— Ceylon 1s. 3.14d., Java 11.83d., Indian Northern 1s. 0.99d., Indian Southern 1s. 1.63d., Sumatra 10.40d. Java 11.83d.

The latest Colombo average prices available, quoted from *The Ceylon Tea Market Report* of 30th December, 1938, of the Ceylon Brokers' Association, are as follows, in rupee cents per lb.:— High Grown Teas 78, Medium Grown Teas 69, Low Grown Teas 63.

Coffee.—Liberian coffee was quoted throughout the month at $14.50 per picul, Excelsa at $10.50, and Robusta at $6.50.

Singapore prices declined in December, Sourabaya coffee averaged $10.20 to $9.10, and Palembang coffee from $12.30 to $11.25 per picul, these being averages of highest and lowest quotations.

Spices.

Arecanuts.—The average of Singapore Chamber of Commerce quotations per picul were: Best $7.45, Medium $7.10, Mixed $6.40, as compared with $7.81, $7.44 and $6.56 in November.

The average of highest and lowest quotations per picul in Singapore were as follows:— Splits $7.25 to $4.75; Red Whole $6.80 to $5.55; Sliced $9.35 to $6.90; as compared with $6.65 to $4.87, $6.69 to $5.12 ond $10.75 to $7.50 per picul respectively in November. The price within there ranges depends on quality.

Pepper.—Singapore Black was quoted throughout the month at $8 per picul. Singapore White dropped at the end of the month 25 cents to $11.50 per picul, and Muntok White a similar drop to $11.75. The average prices of these grades respectively were $11.70, and $11.95 per picul.

Nutmegs.—Prices for both 110's and 80's remain at $28 per picul. The Penang market price was $18 per picul.

Mace.—Nominal prices in Singapore were, Siouw $80 per picul, Amboina $60 per picul. The Penang price was $70 per picul.

Cloves.—Both Zanzibar and Amboina cloves were quoted, nominally, in Singapore at $40 per picul. In Penang, harvesting continued at 4 cents per kati, weather was favourable for drying, and the price for the very best quality is reported to have reached $50 per picul.

Cardamoms.—The price of green cardamoms as quoted in *The Ceylon Chamber of Commerce Weekly Report* for 19th December 1938 was from Rs.1.05 to Rs.1.18 per lb.

Miscellaneous.

Derris.—The average Singapore prices in December were as follows: for root sold on basis of ether extract $8 to $10 per picul; for root sold on basis of rotenone content $17 to $19 per picul. The market was quiet, with very little demand.

Gambier.—Block gambier was quoted in Singapore at $7 per picul (nominal) and Cube No. 1 at $15 per picul.

Sago.—In Singapore, the price for Pearl sago was $3.70 throughout the month. Flour Sarawak Fair tended to improve in price, quotations during the month being from $2.07½ to $2.17½ per picul, the average price for the month being $2.13. Average prices in November were $3.77 and $2.18 respectively.

Tapioca.—Flake fair dropped 20 cents to $3.90, the average price being $3.95, as compared with $4.10 in November. Seed Pearl and Pearl Medium remained at the November level of $3.90 and $4.50 per picul respectively.

Tobacco.—Prices showed no material variation over those ruling in November. The three grades were quoted at $35, $29 and $20 per picul respectively in Penang, in Kedah at $35, $25 and $14. Grade I in Malacca was from $20 to $24 per picul, while in Pahang North the three grades were per picul $18 to $35, $13 to $15 and $5 to $10. The usual high prices ruled in Kelantan, and the usual wide variation in price according to district and grade of tobacco in Johore. In Labuan the price was from $80 to $70 per picul.

The above prices are based on London and Singapore daily quotations for rubber, on the Singapore daily prices for copra, on the Singapore Chamber of Commerce Weekly Reports for the month and on other local sources of information. Palm Oil reports and certain coffee prices are kindly supplied by Messrs. Guthrie & Co., Ltd., Kuala Lumpur, the Singapore prices of imported coffee and arecanuts by Lianqui Trading Company of Singapore, and Singapore derris prices by Messrs. Hooglandt & Co., Singpaore.

1 Picul = 133 1/3 lbs The Dollar is fixed at two shillings and four pence.

Note.—The Department of Agriculture will be pleased to assist planters in finding a market for agricultural produce. Similar assistance is also offered by the Malayan Information Agency, 57 Trafalgar Square, London, W.C.2.

GENERAL RICE SUMMARY.*

November, 1938.

Malaya.—The imports of foreign rice during November were 60,491 tons,† exports were 17,151 tons; net imports were therefore 43,340 tons as compared with 60,443 tons in October.

Gross imports for the first eleven months of 1938 were 752,477 tons, exports were 180,800 tons, net imports being 571,677 tons as compared with 531,703 tons during the corresponding period of 1937.¶

Of the imports during November, 50 per cent. were consigned to Singapore, 16 per cent. to Penang, 7 per cent. to Malacca, 17 per cent. to the Federated Malay States and 10 per cent. to the Unfederated Malay States. The foreign imports by countries of origin were as follows (in tons, percentages in brackets):— Siam 44,726 (73.9), Burma 14,035 (23.2), French Indo-China 496 (0.8), elsewhere 1,234 (2.1).

Of exports during November, 74 per cent. were consigned to the Netherlands Indies and 26 per cent. to other countries. The various kinds of rice exported were as follows (in tons, percentages in brackets):—Siam 14,001 (81.6), Burma 2,557 (14.9), French Indo-China 515 (3.0), parboiled rice 52 (0.3), Malayan 26 (0.2).

Net imports of rice during November, by countries of origin were, in tons:— Siam 30,725, Burma 11,478, French Indo-China 19, elsewhere 1,156.

India.—Foreign exports of rice, January to October 1938 were 226,000 tons, as compared with 657,000 in 1937, a decrease of 65.6 per cent.

Of these exports 2.2 (3.9) per cent. were to the United Kingdom, 3.5 (5.8) per cent. to the Continent of Europe, 38.1 (29.1) per cent. to Ceylon, 4.9 (21.6) per cent. to the Straits Settlements and the Far East, and 51.3 (39.6) per cent. to other countries. The figures in brackets are for the corresponding period of 1937.

Burma.—Foreign exports of rice from 1st January to 23rd November 1938 were 2,907,477 tons, as compared with 2,990,957 tons in 1937, a decrease of 2.8 per cent. Of these exports, 40.4 (44.1) per cent. were to India, 11.2 (9.5) per cent. to the United Kingdom, 9.6 (10.2) per cent. to the Continent of Europe, 12.0 (11.6) per cent. to Ceylon, 14.6 (14.5) per cent. to the Straits Settlements and the Far East, and 12.2 (10.1) per cent. to other countries. The figures in brackets refer to the corresponding period of 1937.

Average November prices in rupees per 100 baskets of 75 lbs. each at Rangoon were:—Big Mills Specials 204, Small Mills Specials 215.

According to the second forecast of the rice crop in Burma for the year 1938-39, the area likely to mature is estimated at 12,695,900 acres, an increase of 0.8 per cent. as compared with the final figures for last year. The season has been so far a very satisfactory one and unless something unforeseen occurs, the prospects of the crop are very favourable.

* Abridged from the Rice Summary for November, 1938, compiled by the Department of Statistics, Straits Settlements and Federated Malay States.

† Ton = long ton (2,240 lbs.)

¶ It is to be understood throughout this Summary, that all comparisons and percentage increases or decreases are in relation to the corresponding period of 1937.

Siam.—Exports of rice and rice products from Bangkok during September were 92,151 tons, giving a total of 1,141,233 tons for the first nine months of 1938 as compared with 720,402 tons in 1937.

The latest report from 60 provinces (end of October) states that the area sown totals 7,185,391 acres; at the same time last year 7,270,888 acres were given as cultivated area. About 455,057 acres have been reported damaged as compared with 614,865 acres last year. About 90 per cent. of the damage is due to flood.

Japan.—The second estimate of the 1938 rice crop of Japan (end of October) is reported at 8,988,512 tons, representing a decrease of 93,966 tons, or 1 per cent. as compared with the first estimate.

The rice stocks of Japan on 1st November, the opening of the present rice season, amounted to 1,191,015 tons, an increase of 137,477 tons, or about 13 per cent. over the corresponding date in 1937.

On the basis of the second crop prediction and the actual stocks of rice on 1st November, the supply and demand of rice for the present rice year are estimated as follows:—

Supply:	tons	Demand:	tons
Stocks brought forward from previous season ...	1,191,000	Estimated consumption ...	11,150,000
Production ...	8,989,000	Estimated exports abroad ...	10,000
Estimated imports from abroad ...	42,000	Estimated exports to colonies ...	72,000
Estimated imports from colonies ...	2,040,000		
	12,262,000		11,232,000

Rice stocks on 31st October, 1939, the next between-season 1,030,000 tons.

French Indo-China.—Entries of padi into Cholon from 1st January to 15th November were 921,778 tons, as compared with 1,315,186 tons in 1937, a decrease of 29.9 per cent. Exports of rice during this period were 1,000,851 tons, as compared with 1,387,806 tons in 1937, a decrease of 27.9 per cent.

The Saigon rice report for October 1938, states that the firmness noted in prices of rice and padi after the international détente was not maintained in October. The rice market showed little activity, and demand was for shipment only. Prices weakened constantly, particularly in the second fortnight, falling from $3.55 per picul on the 1st to $3.50 on the 15th and to $3.39 at the close of the month.

Arrivals of padi were slight and the market inactive. Prices weakened from $2.31 per picul to $2.27 in mid-month and $2.24 on the 31st.

Netherlands Indies.—The latest information available was published in the Summary for October, 1938.

Ceylon.—Imports of rice for the first eleven months of 1938 were 491,017 tons, as compared with 480,206 tons in 1937, an increase of 2.3 per cent.

Of these imports 18.1 (17.1) per cent. were from British India, 68.6 (70.2) per cent. from Burma, 0.2 (0.1) per cent. from the Straits Settlements and 13.1 (12.6) per cent. from other countries. The figures in brackets are for the corresponding period of 1937.

Europe and America.—Shipments of rice from the East to Europe from 1st January to 10th November were 1,117,500 tons, as compared with 1,029,460 tons in 1937, an increase of 8.6 per cent.

Of these shipments, 40.7 (41.2) per cent. were from Burma, 47.3 (52.9) per cent. from Saigon, 10.8 (4.2) per cent. from Siam, and 1.2 (1.7) per cent. from Bengal. The figures in brackets are for the corresponding period of 1937.

Shipments for the Levant from 1st January to 26th October were 28,336 tons, as compared with 16,128 tons in 1937, an increase of 75.7 per cent.

Shipments for Cuba, West Indies and America from 1st January to 21st October were 165,909 tons, as compared with 213,141 tons in 1937, a decrease of 22.2 per cent.

MALAYAN AGRICULTURAL EXPORTS, OCTOBER, 1938.

PRODUCT.	Net Exports in Tons				
	Year 1937	Jan./Oct. 1937	Jan./Oct. 1938	October 1937	October 1938
Arecanuts ...	30,084	24,751	28,268	1,510	342
Coconuts fresh ...	95,223†	79,322†	88,612†	9,835†	11,705†
Coconut oil ...	39,762	32,950	38,791	3,429	5,217
Copra ...	75,592	56,796	50,589	6,625	12,710
Gambier, all kinds ...	1,955	1,645	1,332	109	123
Copra cake ...	15,026§	12,505	5,369	1,495	365
Palm kernels ...	7,312	5,418	7,269	777	977
Palm oil ...	42,787	35,539	47,018	4,460	5,019
Pineapples, canned ...	80,502	71,539	64,609	2,765	4,622
Rubber ...	503,127¶	409.764¶	335,658¶	42,872¶	24,238¶
Sago,—flour ...	15,478	13,116	3,625	2,719	229
,, —pearl ...	3,759	3,119	3,567	556	386
,, —raw ...	8,256*	6,803*	4,330*	852*	310*
Tapioca,—flake ...	1,058	924	791	86	104
,, —flour ...	2,393*	1,849*	2,623*	171*	233*
,, —pearl ...	18,786	14,021	15,079	1,170	1,638
Tuba root ...	573	515	494	35	87

† hundreds in number. * net imports. ¶ production. § gross exports.

MALAYAN PRODUCTION OF PALM OIL AND KERNELS

(In long tons, as declared by Estates)

Month 1938	Palm Oil		Palm Kernels	
	F.M.S.	U.M.S.	F.M.S.	U.M.S.
January	2,241.7	1,309.2	383.7	232.0
February	2,040.4	1,457.1	370.4	261.0
March	2,359.6	1,843.1	446.8	344.0
April	1,963.7	1,122.6	353.6	218.0
May	1,491.7	1,480.7	274.8	258.0
June	1,773.5	1,781.2	315.9	247.0
July	2,546.5	2,134.2	450.8	311.0
August	3,587.4	2,798.1	587.8	437.0
September	3,415.9	1,779.2	591.4	289.0
October	2,817.9	2,056.3	483.0	304.0
November	2,451.6	1,934.3	450.1	297.0
Total ...	26,689.9	19,696.0	4,708.3	3,198.0
Total January to November, 1937	25,430.9	16,282.2	4,572.4	2,569.2
Total for the year 1937 ...	27,733.5	17,932.8	5,094.7	2,811.4

Stocks on estates as at 30th November, 1938, were palm oil 2,377 tons, palm kernels 632 tons.

MALAYAN RUBBER STATISTICS

Acreages of Tappable Rubber actually Tapped and not Tapped on Estates of 100 Acres and over, for the Month ending 30th November, 1938.

State or Territory	Estimated Acreages of Tappable Rubber	Actual area tapped during the month Acreage	Percentage of (3) to (2)	Acreages of tappable rubber not tapped: Estates which have entirely ceased tapping — Acreage	Percentage of (5) to (2)	On estates which have partly ceased tapping: Otherwise than under rotational systems — Acreage	Percentage of (7) to (2)	Under rotational systems — Acreage	Percentage of (9) to (2)	Area of Tappable Rubber never been tapped — Acreage	Percentage of (11) to (2)	Total area not tapped (5) + (7) + (9)	Percentage of (13) to (2)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
S. S.—													
Province Wellesley ...	43,335	19,386	44.7	932	2.2	14,861	34.3	8,156	18.8	443	1.0	23,949	55.3
Malacca ...	121,444	55,594	45.8	5,097	4.2	32,600	26.8	28,153	23.2	2,070	1.7	65,850	54.2
Penang ...	2,478	1,205	48.6	nil	nil	1,213	49.0	60	2.4	9	0.4	1,273	51.4
Singapore ...	32,234	15,026	46.6	4,677	14.5	8,165	25.3	4,366	13.6	115	0.4	17,208	53.4
Total S.S. ...	199,491	91,211	45.7	10,706	5.4	56,839	28.5	40,735	20.4	2,637	1.3	108,280	54.3
F. M. S.—													
Perak ...	285,505	152,033	53.3	9,634	3.4	72,889	25.5	50,949	17.8	6,990	2.4	133,472	46.7
Selangor ...	321,157	193,410	60.2	6,059	1.9	59,046	18.4	62,642	19.5	6,849	2.1	127,747	39.8
Negri Sembilan ...	256,020	135,810	53.0	9,729	3.8	61,021	23.9	49,460	19.3	7,103	2.8	120,210	47.0
Pahang ...	86,620	42,463	49.0	7,532	8.7	25,010	28.9	11,615	13.4	6,672	7.7	44,157	51.0
Total F.M.S. ...	949,302	523,716	55.2	32,954	3.5	217,966	22.9	174,666	18.4	27,614	2.9	425,586	44.8
U. M. S.—													
Johore ...	477,187	262,176	54.9	21,211	4.5	124,612	26.1	69,188	14.5	33,731	7.1	215,011	45.1
Kedah ...	199,612	110,169	55.2	9,440	4.7	36,570	18.3	43,433	21.8	6,142	3.1	89,443	44.8
Kelantan ...	31,333	18,224	58.2	403	1.3	7,531	24.0	5,175	16.5	2,383	7.6	13,109	41.8
Trengganu (*b*) ...	4,817	3,037	63.0	nil	nil	97	2.0	1,683	35.0	74	1.5	1,780	37.0
Perlis (*c*) ...	1,371	621	45.3	262	19.1	354	25.8	134	9.8	75	5.5	750	54.7
Brunei ...	5,746	2,471	43.0	nil	nil	2,601	45.3	674	11.7	255	4.4	3,275	57.0
Total U.M.S. ...	720,066	396,698	55.1	31,316	4.3	171,765	23.9	120.287	16.7	42,660	5.9	323,368	44.9
Total Malaya ...	1,868,859	1,011,625	54.1	74,976	4.0	446,570	23.9	335,688	18.0	72,911	3.9	857,234	45.9

Notes:—(*a*) The acreage shown in column (11) is included in columns (5) and (7).
(*b*) Registered companies only.

Acreage, Stocks, Production, Imports and Exports of Rubber, including Latex, Concentrated Latex and Revertex, for the month of November, 1938 in Dry Tons.

State or Territory	Stocks at beginning of month 1			Production by Estates of 100 acres and over		Production by Estates of less than 100 acres estimated 2		Imports during the month		Imports January to Nov. 1938		Exports including re-exports during the month		Exports including re-exports January to Nov. 1938		Stocks at end of month			Consumption 3	
	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to Nov. 1938	during the month	Jan. to Nov. 1938	Foreign	From Malay States & Labuan	Foreign	From Malay States & Labuan	Foreign	Local	Foreign	Local	Ports	Dealers	Estates of 100 acres and over	during the month	Jan. to Nov. 1938
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Malay States :—																				
Federated Malay States ...	...	8,059	21,716	10,493	119,626	1,878	51,766	Nil	Nil	Nil	Nil	8,894	3,300	*127,664 †125,271	39,155	...	6,047	23,887	18	179
Johore ...	...	2,136	8,503	4,226	53,661	1,754	30,298	Nil	71	Nil	370	2,015	3,823	30,234	52,877	...	2,052	8,800	...	...
Kedah ...	...	260	4,743	2,346	28,991	622	8,903	Nil	Nil	Nil	Nil	1,205	1,381	17,597	19,041	...	191	5,194	...	...
Perlis ...	...	20	25	11	132	13	221	Nil	Nil	Nil	Nil	Nil	27	Nil	336	...	11	31	...	...
Kelantan ...	...	550	658	243	3,807	276	6,256	Nil	Nil	Nil	Nil	290	372	3,051	7,033	...	399	666	...	...
Trengganu ...	...	‡49	‡230	126	2,666	117	1,391	Nil	Nil	Nil	Nil	Nil	215	5	4,024	...	26	281	...	...
Brunei ...	...	14	84	38	487	45	708	...	...	...	...	...	93	...	1,182	...	7	81	...	...
Total Malay States	...	‡11,088	‡35,959	17,483	209,370	4,705	99,543	Nil	71	Nil	370	12,404	9,211	178,551	123,648	...	8,733	38,940	18	179
S. Settlements :—																				
Malacca ...	...	2,189	1,993	943	11,637	378	5,391	Nil	8,198	Nil	124,917	1,649	Nil	24,678	Nil	...	1,726	2,132	...	...
Province Wellesley ...	...	2,512	836	385	4,392	125	2,173	Nil		Nil		6,079		79,113		...	1,503	917	...	...
Penang ...	1,186	4,929	14	15	190	40	814	2,172		27,580						2,055	4,066	15	...	...
Singapore ...	5,132	23,663	276	100	1,490	53	534	8,007		120,399		19,208		211,668		3,386	21,761	291	34	284
Labuan ...	...	27	Nil	Nil	Nil	11	124	40		515		Nil		Nil		...	26	Nil	...	...
Total Straits Settlements ...	6,318	33,320	3,119	1,443	17,709	607	9,036	10,219	8,198	148,494	124,917	26,935	Nil	315,459	Nil	5,441	29,082	3,355	34	284
Total Malaya ...	6,318	‡44,408	‡39,078	18,926	227,079	5,312	108,579	10,219	8,269	148,494	125,287	39,340	9,211	494,010	123,648	5,441	37,815	42,295	52	463

*Ocean Shipments from Malaya of rubber directly consigned from F.M.S. †Exports of rubber from F.M.S.

TABLE II
DEALERS' STOCKS, IN DRY TONS 3

Class of Rubber	Federated Malay States	S'pore	Penang	Province We'sly D'dings M'cca,	Johore	Kedah
22	23	24	25	26	27	28
Dry Rubber	5,302	22,206	3,938	3,096	1,690	95
Wet Rubber	745	565	128	166	362	96
Total ...	6,047	21,761	4,066	3,262	2,052	191

TABLE III
FOREIGN EXPORTS

PORTS	For month	Jan. to Nov. 1938
29	30	31
Singapore ...	27,154	330,596
Penang ...	8,821	116,179
Port Swettenham.	3,176	45,015
Malacca ...	189	2,220
Malaya ...	39,340	494,010

TABLE IV
DOMESTIC EXPORTS 4

AREA	For month	Jan. to Nov. 1938
32	33	34
Malay States ...	21,532	299,114
Straits Settlements	1,885	25,341
Malaya ...	23,417	324,455

Notes:—

1. Stocks on estates of less than 100 acres and stocks in transit on rail, road or local steamer are not ascertained
2. The production of estates of less than 100 acres is estimated from the formula: Production + Imports + Stocks at beginning of month = Exports + Stocks at end of month, + Consumption, *i.e.*, Column [7] = Columns [13] + [14] + [17] + [18] + [19] + [20] − [2] − [3] − [4] − [5] − [9] − [10]. For the Straits Settlements the production of estates of less than 100 acres is represented by sales or exports as shown by cess paid.
3. Dealers' stocks in the Federated Malay States are reduced to dry weights by the following fixed ratios: unsmoked sheet, 15% wet sheet, 25% scrap, lump, etc., 40%; stocks elsewhere are in dry weights as reported by the dealers themselves.
4. Columns (33) and (34) represent exports of rubber subject to regulation which, for Singapore and Penang Islands are represented by sales or exports as shown by cess paid.
5. All statements are brought up to date monthly, and any inaccuracies that may be disclosed are corrected in the totals; the latest publication therefore, is always the most reliable.
6. The above, with certain omissions, is the Report published by the Registrar-General of Statistics, S.S and F.M.S., at Singapore on 23rd December, 1938

METEOROLOGICAL SUMMARY, MALAYA, NOVEMBER, 1938.

Locality.	Air Temperature in degrees Fahrenheit							Earth Temperature		Rainfall								Bright Sunshine.		
	Means of			Absolute Extremes						Total.		Most in a day.	Number of days.					Total.	Daily Mean.	Per cent.
	A. Max.	B. Min.	Mean of A and B	Highest Max.	Lowest Min.	Lowest Max.	Highest Min.	At 1 foot	At 4 feet			Amt.	Precipitation .01 in or more	Precipitation, .04 in or more	Thunder-storm	Fog morning obs.	Gale force 8 or more			
	°F	°F	°F	°F	°F	°F	°F	°F	°F	in.	mm.	in.						hrs.	hrs.	
Railway Hill, Kuala Lumpur, Selangor ...	88.7	72.1	80.4	93	69	82	75	83.4	84.5	4.30	109.2	1.37	16	12	—	3	—	160.05	5.33	44
Bukit Jeram, Selangor ...	88.1	71.9	80.0	92	70	79	75	83.6	85.8	7.60	193.0	1.71	16	13	1	1	1	187.90	6.26	52
Sitiawan, Perak ...	87.6	72.6	80.1	90	65	79	76	83.4	84.3	6.73	170.9	2.42	12	11	—	—	—	171.80	5.73	48
Ipoh Aerodrome, Perak ...	88.4	71.9	80.1	92	67	78	75	82.7	83.9	7.46	189.5	1.28	15	12	4	—	—	170.00	5.67	47
Temerloh, Pahang ...	88.0	72.4	80.2	92	70	81	74	84.5	86.2	3.85	97.8	0.92	18	14	2	5	—	134.85	4.49	37
Kuala Lipis, Pahang ...	87.9	71.0	79.5	91	68	78	73	83.0	84.4	17.75	450.9	2.39	21	18	4	18	1	159.50	5.32	45
Kuala Pahang, Pahang ...	84.5	74.0	79.3	89	71	78	79	83.0	85.6	10.22	259.6	3.20	18	16	2	—	—	157.40	5.25	44
Kallang Aerodrome, S'pore ...	85.9	74.5	80.2	89	71	78	77	81.9	83.2	6.44	163.6	1.98	20	15	5	—	1	138.85	4.63	38
Bayan Lepas Aerodrome Penang ...	86.0	73.5	79.7	89	67	78	76	83.1	84.1	5.41	137.4	1.08	14	13	3	—	—	183.55	6.12	52
Malacca Town, Malacca ...	84.6	73.3	78.9	87	71	79	76	82.3	84.0	7.51	190.8	1.35	18	13	5	—	5	156.20	5.21	43
Kluang, Johore ...	87.3	71.8	79.5	91	69	77	73	81.7	82.5	9.72	246.2	1.98	20	20	6	8	1	135.45	4.51	38
Mersing, Johore ...	85.0	72.1	78.5	91	70	78	75	81.2	82.1	14.65	372.1	5.15	18	13	2	—	2	138.80	4.63	39
Alor Star, Kedah ...	86.6	72.5	79.5	91	68	74	75	84.5	85.3	6.42	163.1	1.49	14	12	4	3	—	176.20	5.87	49
Kota Bahru, Kelantan ...	84.0	72.5	78.3	91	70	74	75	81.6	84.1	39.03	991.4	8.27	12	18	3	—	1	167.95	5.60	47
Kuala Trengganu, Trengganu	84.0	72.5	78.3	91	70	74	75	80.4	83.3	35.48	901.2	8.11	19	18	2	—	—	170.25	5.67	48
Labuan ...	86.0	76.0	81.0	88	73	82	78	83.7	85.8	15.19	385.8	3.98	24	20	—	—	1	201.65	6.72	56
HILL STATIONS.																				
Fraser's Hill, Pahang 4268 ft.	72.0	61.8	66.9	77	60	67	64	70.9	71.8	4.64	117.9	1.38	15	13	—	14	—	128.00	4.27	35
Cameron Highlands, Tanah Rata, Pahang 4750 ft. ...	70.9	56.2	63.8	73	44	65	62	69.8	70.0	7.19	182.6	1.48	20	16	2	—	1	133.05	4.43	37
Cameron Highlands, Rhododendron Hill, Pahang 5120 ft. ...	71.4	58.9	65.3	75	55	64	61	*	*	7.66	194.6	1.38	19	16	2	—	1	136.65	4.55	38

* Not recorded.

Compiled from Returns supplied by the Meteorological Branch, Malaya.